

**PLANS, SPECIFICATIONS
AND
CONTRACT DOCUMENTS**

For the

**CITY OF ST. GEORGE
and
WASHINGTON COUNTY**

**DIXIE CENTER ROADWAY AND
PARKING LOT REPLACEMENT PROJECT**



July 2010

**Documents and Drawings Prepared by
City of St. George
175 East 200 North
St. George, UT 84770**

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PUBLIC NOTICE

July 2010

Advertisement of Bid

Separate sealed bids for the Dixie Center Roadway and Parking Lot Replacement Project will be received by the Washington County at their Commissioner's office at 197 East Tabernacle Street, St. George, UT 84770, until no later than 10:00 A.M., Tuesday, July 13th, 2010, and at that time in the Washington County Commissioner's Chambers, bids will publicly be opened and read aloud.

The project will consist of the construction of approximately 1,500 lineal feet of roadway, 134,000 square feet of parking lot with lighting and landscaping, and approximately 1,000 lineal feet of 12 inch storm drain pipe.

A mandatory Pre-Bid Meeting will be held on Thursday, July 8, 2010 at 9:00 a.m. The meeting will originate on-site, at the northeast parking lot of the Dixie Center, located at 1835 South Convention Center Drive, St. George, Utah.

The County reserves the right to reject any or all bids or waive any irregularity.

Copies of the Contract Documents and Specifications may be examined and/or obtained at the Washington County Administration Building, 197 East Tabernacle, St. George, UT. 84770. Plans will be available after July 6, 2010. A Fee of \$25 will be charged for plans and specifications, no part of which is refundable.

Billing: Washington County
Verification of Publication: Washington County

INFORMATION FOR BIDDERS

BIDS will be received by Washington County, at the Commissioner's Office at 197 East Tabernacle Street, St. George, UT 84770 until 10:00 A.M., Tuesday, July 13th, 2010 and then at said office publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to the Washington County at 197 East Tabernacle Street, St. George, UT 84770. Each sealed envelope containing a BID must be plainly marked on the outside as BID for the Dixie Center Roadway and Parking Lot Replacement Project, and the envelope should bear on the outside the name of the BIDDER, his address, his license number if applicable and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at 197 East Tabernacle Street, St. George, UT 84770.

A mandatory Pre-Bid Meeting will be held on Thursday, July 8, 2010 at 9:00 a.m. The meeting will originate on-site, at the northeast parking lot of the Dixie Center, located at 1835 South Convention Center Drive, St. George, Utah.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The Washington County/ St. George Interlocal Agency (WCIA) (herein called the "OWNER") may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR

or relieve him from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms.

In case of failure of the BIDDER to execute the Agreement, the OWNER may at his option consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) days of receipt of acceptable performance BOND, payment BOND and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as he deems necessary to determine

the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsible BIDDER as determined by the OWNER using the criteria contained in St. George City ordinances governing the award of contracts.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to his BID.

The CONTRACTOR shall submit to the OWNER an acceptable construction schedule to end 45 calendar days after the date on the NOTICE TO PROCEED.

For use of the OWNER, in determining competency and capability of those who will work on the OWNER'S project, the BIDDER shall submit with his bid a list naming the subcontractors and major suppliers who will be used in performing the work on this project.

By this requirement, the OWNER does not establish any contractual relationship between it and any subcontractor, nor will the OWNER inquire into any contractual or other relations of the BIDDER with any subcontractor.

Such list shall be binding upon the CONTRACTOR, however, the OWNER has the right to reject any or all subcontractors it deems unqualified to perform the work. The OWNER may withhold awarding a contract to any particular BIDDER if one or more of his proposed subcontractors are considered by the OWNER to be unqualified.

The successful CONTRACTOR shall be responsible to provide a Certified Work Certificate upon acceptance of Agreement.

BID

Proposal of _____(hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____* to the Washington County/ St.George Interlocal Agency (WCIA) (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the Dixie Center Roadway and Parking Lot Replacement Project in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 90 days from the Notice to Proceed, and meet the required intermediate deadlines as outlined in the specifications. BIDDER further agrees to pay as liquidated damages, the sum of \$ 2500.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

*Insert "a corporation", "a partnership", or "an individual" as applicable.

BIDDER has visited the site and become familiar with and satisfied itself as to the general, local, and site conditions that may affect cost, progress, and performance of the work.

BIDDER is familiar with and has satisfied itself as to all Federal, state, and local

laws and regulations and permits that may affect cost, progress, and performance of the work.

**WASHINGTON COUNTY/ ST. GEORGE INTERLOCAL AGENCY (WCIA)
DIXIE CENTER ROADWAY AND PARKING LOT REPLACEMENT PROJECT**

Bidder agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit or lump sum prices.

Bidder will complete the work in accordance with the Contract Documents for the following unit prices. Quantities indicated are not guaranteed; they are solely for comparing bids and establishing the initial Contract Price. Final payment will be based on actual quantities.

NOTE: the Engineer shall check All bids for mathematical errors. If errors have been made in the extension of the figures, it will be assumed that the unit prices are correct and the total amounts will be revised to reflect the corrections.

BID SCHEDULE

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL
1	Mobilization	1	L.S.		
2	Excavation, Earthwork, and Grading (Approximately 9,100 c.y. Excavation, 1,700 c.y. Export)	1	L.S.		
3	Removals	1	L.S.		
4	Construct HB 30-7 Curb and Gutter	1,305	L.F.		
5	Construct 5' Wide Sidewalk	1,497	L.F.		
6	Construct 4' Concrete Waterway	375	L.F.		
7	Construct ADA Compliant Handicap Ramps along Roadway	12	Each		
8	Furnish and Install 10" Compacted Roadbase (Roadway)	49,518	S.F.		
9	Furnish and Install 4" Asphalt (3/4" Non-Rutting Mix - Roadway)	49,518	S.F.		
10	Construct 24" On-Site Collecting Curb (Parking Lot)	1,095	L.F.		
11	Construct 24" On-Site Shedding Curb (Parking Lot)	2,215	L.F.		
12	Furnish and Install 8" Compacted Roadbase (Parking Lot)	137,664	S.F.		
13	Furnish and Install 3" Asphalt Pavement (Parking Lot)	137,664	S.F.		
14	Construct 4" Thick Concrete Sidewalk	2,070	S.F.		

15	Construct 24" Concrete Waterway	43	L.F.		
16	Construct ADA Compliant Handicap Ramps (Parking Lot)	87	L.F.		
17	Provide Parking Lot and Street Lighting System (Including all Electrical Trenching, Conduit, Conductors, Transformers, Junction Boxes, Pedestal Relocation, etc.)	1	L.S.		
18	Furnish and Install Street Lights	8	Each		
19	Furnish and Install Parking Lot Lights	10	Each		
20	Landscaping	1	L.S.		
21	Erosion Control	1	L.S.		
22	Parking Lot Painting	1	L.S.		
23	Connect to Existing Storm Drain Box	1	L.S.		
24	Furnish and Install 12" ADS Storm Drain Pipe	452	L.F.		
25	Furnish and Install 12" RCP Concrete SD Pipe	983	L.F.		
26	Furnish and Install Concrete Storm Drain Catch Basin	8	Each		
27	Sawcut Asphalt, and Replace Existing Asphalt Pavement in 1670 South Street	200	S.F.		
TOTAL OF SCHEDULE					

ATTEST:

RESPECTFULLY SUBMITTED:

(Seal - If Bid is by Corporation)

Address

Signature

Name

Title

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,
_____ as Principal, and _____ as Surety, are hereby held and firmly
bound unto _____ as OWNER in the penal sum of _____ for the
payment of which, well and truly to be made, we hereby jointly and severally bind ourselves,
successors and assigns.

Signed, this _____ day of _____, 2010. The Condition of the above
obligation is such that whereas the Principal has submitted to _____ a
certain BID, attached hereto and hereby made a part hereof to enter into a contract in
writing, for the _____ NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a
contract in the Form of Contract attached hereto (properly completed in accordance
with said BID) and shall furnish a BOND for his faithful performance of said contract,
and for the payment of all persons performing labor or furnishing materials in
connection therewith, and shall in all other respects perform the agreement created
by the acceptance of said BID,

THEN this obligation shall be void, otherwise the same shall remain in force and effect; it
being expressly understood and agreed that the liability of the Surety for any and all claims
hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By:

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 2010 by and between the Washington County/ St. George Interlocal Agency (WCIA), hereinafter called "OWNER" and _____ doing business as a _____ hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete the construction of the Dixie Center Roadway and Parking Lot Replacement Project.
2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described therein.
3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within 45 calendar days after the date of the NOTICE TO PROCEED and will complete the same as specified in Section 101, unless the period _____ for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of \$ _____.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - (A) Public Notice
 - (B) Information For Bidders
 - (C) Bid
 - (D) Proposed Subcontractors List
 - (E) Proposed Suppliers List
 - (F) Bid Bond
 - (G) Agreement
 - (H) Payment Bond
 - (I) Performance Bond
 - (J) Notice of Award
 - (K) Notice to Proceed
 - (L) Change Order
 - (M) General Conditions
 - (N) Supplementary General Conditions
 - (O) SPECIFICATIONS and DRAWINGS prepared or issued by City of St. George Water dated July 2010
 - (P) ADDENDA:
No. _____, dated _____, 2010
No. _____, dated _____, 2010
6. The OWNER will pay to the CONTRACTOR in the manner and at such times as

set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in 5 each of which shall be deemed an original on the date first above written.

OWNER:

Washington County/ St. George Interlocal Agency

BY

Name _____

Title _____

(SEAL)

ATTEST:

Name _____

Title _____

CONTRACTOR:

BY

Name

(Please Type)

Address _____

(SEAL)

ATTEST:

Name _____

(Please Type)

Title _____

APPROVAL AS TO FORM:

By: _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, (Corporation, Partnership, or Individual)
hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____ Dollars, \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____ 2010, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation

shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed hereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 5 counterparts, each one of
(number)
which shall be deemed an original, this the _____ day of _____, 2010

ATTEST:

_____	_____
(Principal) Secretary	Principal
(SEAL)	By _____
_____	_____
Witness as to Principal	Address

Address	

ATTEST:

_____	_____
(Surety) Secretary	Surety
(SEAL)	By _____
_____	Attorney-in-fact
_____	_____
Witness as to Surety	Address

Address	

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____ (Corporation, Partnership, or Individual), hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of

_____ Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 2010, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect. PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in

any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 5 counterparts, Five
(Number)

each one of which shall be deemed an original, this the day of 2010.

ATTEST:

Principal

(Principal) Secretary
(SEAL)

By _____

Address

Witness as to Principal

Address

ATTEST:

Surety

Address

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

NOTICE OF AWARD

To: _____

PROJECT Description: Dixie Center Roadway and Parking Lot Replacement Project

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _ day of _____, 2010.

Washington County/ St. George Interlocal Agency

Owner

By

Name _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged
by _____,

this the _____ day of _____, 2010.

By

Name _____

Title _____

NOTICE TO PROCEED

To: _____

Date: _____
Project: _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2001, on or before _____, 2010, and you are to complete all on-site WORK on or before _____, 2010.

Washington County/ St. George Interlocal Agency
Owner

By

Name _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO
PROCEED is hereby acknowledged by

this the _____ day of _____, 2010.

By _____

Name _____

Title _____

CHANGE ORDER

Order No.

Date:

Agreement Date:

NAME OF PROJECT:

OWNER: Washington County/ St. George Interlocal Agency

CONTRACTOR:

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE

\$

Current CONTRACT PRICE adjusted by previous CHANGE ORDERS

\$

The CONTRACT PRICE due to this CHANGE ORDER will be (decreased) by:

\$

The new CONTRACT PRICE including this CHANGE ORDER will be

\$

CHANGE TO CONTRACT TIME:

The CONTRACT TIME will be (increased) (decreased) by _____ calendar days.

The date for completion of all work will be _____.

APPROVALS

ENGINEER: _____

CONTRACTOR: _____

OWNER: _____

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports, and Records
4. Drawings and Specifications
5. Shop Drawings
6. Materials, Services and Facilities
7. Inspection and Testing
8. Substitutions
9. Patents
10. Surveys, Permits, Regulations
11. Protection of Work, Property, Persons
12. Supervision by Contractor
13. Changes in the Work
14. Changes in Contract Price
15. Time for Completion and Liquidated Damages
16. Correction of Work
17. Subsurface Conditions
18. Suspension of Work, Termination and Delay
19. Payments to Contractor
20. Acceptance of Final Payment as Release
21. Insurance
22. Contract Security
23. Assignments
24. Indemnification
25. Separate Contracts
26. Subcontracting
27. Engineer's Authority
28. Land and Rights-of-Way
29. Guaranty
30. Taxes

Information For Bidders, BID, Bid Bond, Agreement, Payment Bond, Performance

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm or corporation submitting a BID for the WORK.

1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including Advertisement For Bids,

Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR - The person, firm or corporation with whom the OWNER has executed the Agreement.

1.11 DRAWINGS - The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12 ENGINEER - The person, firm or corporation named as such in the CONTRACT DOCUMENTS.

1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the

ENGINEER to the CONTRACTOR during construction.

1.14 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.15 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.16 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the WORK is to be performed.

1.17 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.18 RESIDENT PROJECT REPRESENTATIVE The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.19 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.20 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.21 SUBCONTRACTOR - An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.22 SUBSTANTIAL COMPLETION - That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23 SUPPLEMENTAL GENERAL

CONDITIONS Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings by the ENGINEER as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various

parts of the WORK, estimated date of completion of each part and as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that he anticipates he will earn during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of

any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests or approvals by the engineer or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and his representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or state agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or

otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a

particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on

the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. He will give the ENGINEER prompt WRITTEN NOTICE of significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to

the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME, or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any work covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

- (a) Unit prices previously approved.
- (b) An agreed lump sum.
- (c) The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for

completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER

15.4.1 To any preference, priority or allocation order duly issued by the OWNER.

15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly

remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given the required WRITTEN NOTICE; provided that the OWNER may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by

the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTOR or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such cost exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance

with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the Contract. In such case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENTS TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the

ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER's title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate to the Engineer. The OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment of the basis of the approved partial payment estimate. The OWNER shall retain five (5%) percent of the amount of each payment until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS. The OWNER at any time, however, after fifty (50) percent of the WORK has been completed, if he finds that satisfactory progress is being made, shall reduce retainage to five (5%) percent on the current and remaining estimates. When the WORK is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not

constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BONDS.

21. INSURANCE

21.1 Contractor shall carry insurance required by Laws and Regulations to protect Contractor, Owner and Owner's officials, employees and Engineering Consultants.

21.2 Neither Contractor, nor any Subcontractor, shall enter the site of the Work or commence work under this Contract before Owner has received and accepted Certificate(s) of Insurance, and Insurance Endorsements, and has issued the Notice to Proceed.

21.3 To the fullest extent permitted by laws and regulations, Contractor shall indemnify and hold harmless Owner, and its Engineering Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself,

including the loss of use resulting therefrom, and (ii) is caused in whole or in part by any negligent act or omission of Contractor, any subcontractor, any supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by laws and regulations regardless of the negligence of any such person or entity.

21.4 In any and all claims against Owner or its Engineering Consultants or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any subcontractor, any supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under the previous paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any such subcontractor, supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

21.5 Contractor shall secure and maintain during the Contract Time and warranty period certain insurance that shall protect Contractor, Owner, and its Engineering Consultants in such manner and amounts as set forth hereinafter.

a. The insurance requirements stipulated herein shall not be construed as limiting Contractor's liability.

21.6 All loss or damage arising from obstructions or difficulties which may be encountered in the prosecution of the Work, from the action of the elements, or from any act or omission on the part of Contractor or any Subcontractor, supplier, person, or agent employed by Contractor shall be borne by Contractor.

21.7 Insurance Certificates, shall set forth the following information and shall be signed by an authorized representative of the insurance company.

a. Name and address of the insured.

b. Shall name as Certificate Holder the Owner and Owners Engineering Consultants.

c. The location of the operations to which

the insurance applies.

d. The number of the policy and the type or types of insurance in force thereunder on the date borne by the certificate.

e. The expiration date of the policy and the limit or limits of liability thereunder on the date borne by the certificate.

f. A statement that the insurance covered by the certificate applies to all of the operations on and at the site of the Work which are undertaken by the insured during the life of the Contract.

g. A statement that all coverage is on an occurrence basis rather than a claims basis.

h. A provision that the policy or policies may not be cancelled, denied renewal, or reduced in coverage until at least 30 days after written notice has been sent to Owner.

i. A statement that a cross liability or severability of interests clause is included, unless a separate policy covering Owner and Engineer is provided.

j. Name, address, and telephone number of the insurance company's agent of process in Utah.

k. Other information to demonstrate compliance with additional requirements stipulated for the various types of insurance coverages.

21.8 Compensation Insurance. Contractor shall take out and maintain Worker's Compensation Insurance as required by the Labor Code for all its employees at the site of the Work during the life of this Contract.

a. Insurance certificates shall provide a waiver of subrogation by the carrier to Certificate Holder.

b. Contractor shall require each Subcontractor to provide Workers Compensation Insurance for its employees unless such employees are covered by the Contractor.

c. In the event any class of employees engaged in hazardous work under this Contract is not protected by the Worker's Compensation Statute, Contractor shall provide, and shall cause its Subcontractors to provide, special insurance for the protection of such employees not otherwise protected.

21.9 Commercial General Liability and Property Damage Insurance:

a. Contractor shall procure, and maintain during the life of the Contract, such general liability and property damage insurance necessary to protect itself, Owner, the Certificate Holder, and Subcontractors performing work under this Contract, from all claims and legal costs for bodily

injury or personal injury, including accidental death and property damage claims arising from operations under this Contract, whether such operations are the Contractor's or the Subcontractors'.

b. Certificate Holder shall be named as additional primary insureds without offset against their existing insurance.

c. The Insurance Endorsement shall evidence such provisions.

d. The minimum general liability and property damage liability shall be as follows:

i. Comprehensive general liability insurance for injuries, including accidental death, to any one person in an amount not less than \$2,126,000 Dollars.

ii. Subject to the same limits on account of one occurrence, in a total amount not less than \$2,000,000 Dollars.

iii. Broad form property damage insurance in an amount not less than \$250,000 Dollars.

e. Such policy shall include each of the following coverage's:

i. Comprehensive form.

ii. Premises - operations.

iii. Explosion and collapse hazard.

iv. Underground hazard.

v. Product/completed operations hazard.

vi. Contractual insurance.

vii. Broad form property damage, including completed operations.

viii. Independent contractors.

ix. Personal injury.

x. Fire and extended coverage with endorsement for vandalism and malicious mischief in an amount of at least 50 percent of the Contract Price.

21.10 Motor Vehicle Public Liability and Property Damage Insurance.

a. Contractor shall carry and maintain a motor vehicle public liability and property damage insurance coverage on each vehicle used in the performance of the Work in an amount not less than 1,000,000 Dollars for one person and 2,000,000 Dollars for more than one person and for property damage resulting from any one occurrence which may arise from the operations of Contractor in performing the Work in the sum of 1,000,000 Dollars.

b. Such motor vehicle liability insurance shall include each of the following types:

i. Comprehensive form, including loading and unloading.

ii. Owned.

iii. Hired.

iv. Non-owned.

c. Certificate Holder shall be named as additional primary insured without offset against their existing insurance. Insurance certificates shall name Certificate Holder as additional insured.

21.11 Builder's "All Risk" Insurance. Contractor shall provide Certificates of Insurance showing that Contractor has obtained, for the duration of the Contract Time, Builder's Risk "All Risk" insurance in the amount equal to the Contract Price including flood, tidal wave, and earthquake, but excluding tidal wave and earthquake coverage in excess of 5 percent of the Contract Price. Insurance Certificates, shall name Certificate Holder as additional insured.

21.12 Omissions, Conflicts, Errors, or Discrepancies.

a. Where, during the performance of the Work, Contractor finds omissions, conflicts, errors, or discrepancies in the Contract Documents, Contractor shall so report to Engineer in writing, at once; and before proceeding with the Work affected thereby shall obtain a written clarification or interpretation from Engineer.

b. When Contractor feels that omissions, conflicts, errors, or discrepancies in the Contract Documents will cause or have caused Contractor additional costs or delays in the performance of the Work, Contractor may make a claim.

c. Accordingly, Contractor shall give Engineer:

i. Written notice of such claim within forty-eight hours after the occurrence of the cost and delay related to such omissions, conflicts, errors or discrepancies.

ii. Statement and supporting data within 7 days after the occurrence of the cost and delay related to such omissions, conflicts, errors or discrepancies.

iii. Except for such claims as are made of record in the manner and within the time stated in this Section 21.11, Contractor shall be deemed to have waived and does hereby waive all claims for damages and for adjustments to the Contract Time, the Contract Price, or both, resulting from omissions, conflicts, errors, or discrepancies in the Contract Documents.

d. The Contract Documents Shall Be Interpreted Applying the Following Precedence Rules:

i. Discrepancies between Drawings

and the figures written thereon shall be resolved by taking the figures as correct.

ii. Figured dimensions shall govern over scaled dimensions.

iii. Full scale Drawings shall govern over reduced size Drawings.

iv. Where a dimension necessary for the prosecution of the Work can only be obtained by means of a scaled dimension, Contractor shall request a determination from Engineer.

e. The Contract Document higher in precedence shall control and supersede the Contract Documents lower in precedence in accordance with the following listing arranged from the highest to the lowest in precedence:

i. First: Addenda, if any; Supplemental Agreements; and Change Orders; the one dated later having precedence over another dated earlier.

ii. Second: Agreement.

iii. Third: General Requirements.

iv. Fourth: Other Specifications.

v. Fifth: Drawings.

vi. Sixth: Supplementary Conditions, if any.

vii. Seventh: General Conditions.

viii. Eighth: Instructions to Bidders.

ix. Ninth: Bid Forms.

x. Tenth: Notice Inviting Bids.

21.13 Amendment to Contract Documents:

a. In giving clarifications and interpretations, Engineer shall have authority to make minor changes in the Work, not involving changes to the Contract Price or to the Contract Time.

b. Reuse of Documents: Neither Contractor nor any Subcontractor or supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Owner shall have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents, or copies of any thereof, prepared by or bearing the seal of Design Engineer or Engineer, without the written consent of Owner and Design Engineer or Engineer.

c. Neither Contractor nor any Subcontractor or supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Owner shall reuse any of the Drawings, Specifications, or other documents, or copies of any thereof on extensions of the Project or any other project, without the written consent of Owner and Design Engineer or Engineer, and specific adaptation by Design Engineer or Engineer.

22. CONTRACT SECURITY

20.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance Bond and a Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

202.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in

whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT by himself, or he may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if he is performing the additional WORK himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not

noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves him in additional expense or entitles him to an extension of the CONTRACT TIME, he may make a claim therefor as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and

unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at his own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTY

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable

promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. TAXES

30.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

PART B

TECHNICAL SPECIFICATIONS

DIVISION 100 – GENERAL REQUIREMENTS

SECTION 101

GENERAL REQUIREMENTS

1.1 SUMMARY OF THE WORK. The Dixie Center is a convention center that is located in St. George, Utah. The facilities are jointly owned and operated by the City of St. George, and Washington County. The purpose of this project is to replace Dixie Center parking that is eliminated due to the construction of the Dixie Drive Interchange Project. The Bid Schedule includes construction of approximately 1,500 lineal feet of asphalt paved roadway. The entire 66 foot roadway width will be graded, but only the westerly portion of the roadway will be paved.

Also included in the Bid Schedule is the construction of a parking lot located northeast of the existing Dixie Center. The parking lot is approximately 134,000 square feet in size. The parking lot construction also includes landscaping and lighting. The project landscaping is bid as a lump sum item. However, the successful bidder will be required to submit a schedule of values for the landscaping items that totals his lump sum bid price.

The Contractor should be aware that adjacent construction of the Dixie Drive Interchange U.D.O.T. project will be underway. While it is not anticipated that the UDOT project will interfere with the Dixie Center Roadway and Parking Lot Replacement Project, contractor may be required to coordinate with the Dixie Drive Interchange project contractor if any interferences are anticipated.

The Contractor shall be responsible to obtain an encroachment permit for all work within the public right-of-way and to maintain traffic control per the latest edition of MUTCD and St. George City Standards and Specifications.

Prior to commencement of the project, the Contractor shall be required to provide a Storm Water Pollution Prevention Plan (SWPPP) to St. George City and obtain approval for said Plan. Any changes to the SWPPP during construction shall be provided to the Owner for their records. The Contractor shall be required to obtain a Notice of Intent (NOI) from the State of Utah prior to the issuance of the NOTICE TO PROCEED and file a Notice of Termination with the State of Utah once the project is completed and accepted by the Owner.

Contractor shall be responsible for protecting his work from flooding during seasonal flood events or other acts of God during the construction of the project.

Contractor shall provide erosion control measures for any material that is stockpiled from excavated trenches, roadway construction, trench backfill, or other construction within the project area to prevent the material from eroding due to rain, wind or other storm event.

If the Contractor elects to use $\frac{3}{4}$ " or 1" clean crushed gravel as bedding/pipe zone material and/or initial backfill material in lieu of the bedding/pipe zone material listed in Table 4.1 of

the St. George City Standards and Specifications, the clean crushed gravel shall be wrapped in a filter fabric. The Contractor shall provide a submittal for the filter fabric for review by the Engineer.

1.2 CONTRACT TIME. The Dixie Center will remain open and in operation during the entirety of the project. There are existing parking facilities on the south and west side of the Dixie Center that will provide parking for events at the Dixie Center during the months of July, August, and September. However, beginning September 30, 2010, Those existing parking facilities will not handle the amount of parking that is required for the larger events that are scheduled at the Dixie Center. It is essential that the new parking lot be paved and striped by September 30, 2010. The Contractor will also need to coordinate the completion of the lighting and landscaping of the parking lot with the Dixie Center to accommodate their schedule of events. It is likely that no work will be allowed in the parking lot area from October 1, 2010 through October 16, 2010. The Contractor will be required to complete the full project within 90 consecutive calendar days from the NOTICE TO PROCEED. There are however, some critical dates that need to be met. The parking lot needs to be paved, stripped, and functional on or before September 30, 2010. The northern section of the roadway, from Sta. 19+00 to Sta. 25+40 needs to be paved and stripped before September 30, 2010 to allow access to the parking lot. The remaining work must be completed within the 90 days from the NOTICE TO PROCEED.

In the event the Contractor(s) does not meet the above time schedule, liquidated damages of \$2500.00 per calendar day for each calendar day used beyond the contract time indicated will be assessed. Liquidated damages of \$2500.00 will also be assessed in the event that the parking lot and northern section of the roadway is not paved and functional by the September 30, 2010 deadline.

1.3 CONSTRUCTION STAKING. The Engineer will provide information to the Contractor to establish the location and elevations of the improvements. The Contractor shall notify the Engineer at least 48 hours in advance of where work will take place so that proper location and grade stakes can be provided.

1.4 SAFETY AND HEALTH. The contractor shall comply with, and is responsible for enforcement of safety and health regulations for construction, promulgated by the Secretary of Labor under Section 107 of the Contract Hours and Safety Standards Act, as set forth in Title 29, C.F.R. Copies of these regulations may be obtained from the Labor Building, 14th and Constitution Avenue NW, Washington, DC 20013.

The Contractor shall also comply with the provisions of the Federal Occupational Safety and Health Act as amended.

1.5 REFERENCES. Abbreviations used in this specification for various societies, organizations, or government bodies shall stand for the following:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AISC	American Institute of Steel Construction
AITC	American Institute of Timber Construction
AISI	American Iron and Steel Institute
APA	American Plywood Association
AWWA	American Water Works Association
AWS	American Welding Society
FHA	Federal Housing Authority
ICBO	International Conference of Building Officials
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association
NWWDA	National Wood Window & Door Association
UL	Underwriter's Laboratory
UBC	Uniform Building Code

1.6 QUANTITIES AND PAYMENT. The amount of work to be done, and materials or services to be furnished under the Contract as noted in the proposal, are estimates and are not to be taken as an expressed or implied statement that the actual amount of work or materials will correspond to the estimate. In the event the total amount of the lowest acceptable bid exceeds the amount of funds available for the project, the scope of work will be modified as determined by the Owner and Engineer.

The right is reserved to increase or decrease or to entirely eliminate certain items from the work or materials if found desirable or expedient, and the Contractor is cautioned against unbalancing his bid by prorating his overhead into one or two items only when there are a number of items on the proposal. The overhead and indirect charges should be prorated on all items in the proposal.

The Contractor will be allowed no claims for anticipated profits, loss of profits, or for damages because of any difference between the estimated and the actual amount of work done, or materials furnished or used in the completed project.

Other items of work defined in the specifications, but not listed in the Bid Schedule, shall be considered incidental to one or more of the items listed in the Bid Schedule and shall be paid for under the bid item listed to which it is related, as determined by the Engineer.

1.7 SITE EXAMINATION. The bidder should examine the site before submitting his proposal and inform himself regarding existing facilities and conditions affecting the proposed work. Failure to make such inspection shall in no way relieve the Contractor of any of the obligations or conditions of the specifications and special provisions or serve in any way as a basis of extra remunerations to the Contractor for conditions arising from

unfamiliarity with the site or conditions affecting the work.

1.8 VEHICULAR AND PEDESTRIAN ACCESS. The Contractor shall provide vehicular and pedestrian access to local residents. Local residents shall be allowed vehicular access to their residence and garage by the end of each working day. This shall be accomplished by trenching beyond or short of existing driveways and completing the backfilling of trenches by the end of each working day. All trenches must be backfilled and properly compacted back to finish grade at the end of each working day or be properly barricaded or covered with a steel plate.

1.9 EXISTING UTILITIES. The Contractor shall coordinate the relocation of existing utilities where required with the appropriate utility owner. The Contractor shall also pothole the location and depth of existing utilities at least 500 feet in advance of work at the utility crossing with the sanitary sewer main. The Contractor shall immediately notify the Engineer of any potential conflicts. Failure to pothole or notify the Engineer of potential conflicts shall be at the expense of the Contractor to resolve the utility conflict and obtain approval from the utility company.

SECTION 102

PROJECT MEETINGS

1.1 PRECONSTRUCTION CONFERENCE. A pre-construction conference between the Design Engineer, City Inspectors, various City and County Personnel, and Contractor shall be held at the site prior to commencement of the Work.

- (a) This meeting shall be for the purpose of -
 - (1) Resolving current problems,
 - (2) Further orienting Contractor to requirements of the Contract Documents,
 - (3) Informing Contractor of Engineer's responsibility for inspection,
 - (4) Working out with Contractor a general schedule of inspection.

1.2 PROGRESS MEETINGS. Periodic job site meetings will be held by Engineer.

- (a) Contractor shall attend such meetings and shall require subcontractors to attend as necessary.
- (b) These meetings are for the purpose of -
 - (1) Insuring that all activities are being coordinated properly on project,
 - (2) To assist in staying on schedule.
 - (3) Checking Status of -
 - (a) Submittals,
 - (b) Changes,
 - (c) Progress payments,
 - (d) Other matters will be reviewed.

SECTION 103

SUBMITTALS

1.1 SUBMITTALS. Deliver submittals to the Water Services Engineer unless indicated otherwise. Accompany each submittal with a letter of transmittal indicating:

- (a) Title of Project
- (b) Name of Contractor
- (c) Title of Submittal

1.2 PROGRESS SCHEDULE. Immediately after being awarded the Contract, prepare and submit for review an estimated progress schedule for the Work. Progress schedule shall be in sufficient detail to include but not be limited to:

- (a) Significant elements of the Work.
- (b) Time frame for each element of work with a beginning and ending point.
- (c) Percentage of progress of work placed or to be placed in a monthly period of time.
- (d) Value of the elements of work and relationship of elements of work one to the other for the total work under the Contract.

Progress schedule shall be updated monthly and submitted with each periodic estimate for partial pay, and shall show the original progress schedule or revised progress schedule one entry for each item of work as follows:

- (a) Progress of work placed prior to period of partial payment then being requested.
- (b) Progress during period of partial payment being requested.
- (c) Remaining work to be done by each item of work and for total work remaining under the Contract.

1.3 SUBMITTAL SCHEDULE.

Contractor shall, within ten (10) calendar days after receipt of Notice to Proceed, furnish a submittal schedule listing all items that will be furnished for review to Water Services Engineer.

- (a) This schedule shall include, among other things, shop drawings, Manufacturer's literature, certificates of compliance, materials samples, materials colors, guarantees, etc.
- (b) Schedule shall indicate type of item, contract requirement reference, Contractor's scheduled dates for submitting the items, and projected need dates for review answers from Engineer. Schedule shall show a minimum of seven (7) calendar days after receipt for review by Engineer. If re-submittal is required, an additional five (5) days will be allowed for after receipt. Contractor shall revise and/or up-date this schedule as appropriate and submit it with each payment estimate until all items have been submitted and reviewed.
- (c) Submittal schedule shall be coordinated with progress schedule for all the Work. Contractor shall revise and/or up-date the schedule to insure consistency with the progress schedule as it may be revised and/or updated. Such revised submittal schedules shall be promptly provided.
- (d) Furnishing of the submittal schedule or revision thereto shall not be interpreted as relieving Contractor of his obligation to comply with all the Specification requirements for items on the schedule.

Progress schedule shall be updated monthly and submitted with each periodic estimate for partial pay, and shall show the original progress schedule or revised progress schedule one entry for each item of work as follows:

- (a) Progress of work placed prior to period of partial payment then being requested.
- (b) Progress during period of partial payment being requested.
- (c) Remaining work to be done by each item of work and for total work remaining under the Contract.

1.4 PROGRESS REPORTS.

Contractor shall prepare daily reports of his operations and forward them to Engineer on at least a weekly basis. The daily report will contain at least the following information:

- (a) Weather conditions,
- (b) Manpower on the job in each trade,
- (c) Major items of equipment on the job,
- (d) A brief summary of work accomplished that day,

- (e) Materials, equipment, or Owner-furnished items arriving or leaving site,
- (f) Significant events,
- (g) Any tests made and their result if known,
- (h) Any oral instructions received,
- (i) Visitors to the job.

Contractor shall maintain a file of copies of all daily reports on the site and make it available to the Engineer upon request.

1.5 SHOP DRAWINGS, PRODUCT DATA, & SAMPLES.

Definitions.

- (a) Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data which are prepared by Contractor or any subcontractor, manufacturer, supplier, or distributor. Shop drawings illustrate some portion of the Work and confirm dimensions and conformance to Contract Documents.
 - (1) Shop drawings are not a part of the Contract Documents.
- (b) Samples are physical examples furnished by Contractor to illustrate materials, equipment, color, or workmanship and to assist in the establishment of standards by which the Work will be judged.

Procedure.

- (a) Contractor shall review and designate (stamp) his approval and submit to Engineer, with reasonable promptness and in orderly sequence, all shop drawings and samples required by the Contract Documents.
 - (1) Divisions and Sections of the Project Manual requiring submission of shop drawings to Engineer are as follows. If a broadscope Section heading is given, all of the subsections in that Section are to submit shop drawings.
 - (2) Shop drawings and samples not required by the Contract Documents but requested by Contractor or supplied by those under contract to him need not be submitted to Engineer for approval unless specifically requested. These shop drawings shall meet all specified shop drawing requirements except those relating to submission to Engineer.

- (b) Shop drawings and samples shall be properly identified as specified or as Engineer may require.
- (c) Contractor shall reject shop drawings not in conformance with the Contract Documents.
- (d) Shop drawings shall be complete and detailed. If reviewed by Engineer, each copy of the shop drawings will be identified as having received such approval by being so stamped and dated. If review "with exception" or "as noted" by Engineer is so identified, stamped, and dated, Contractor shall comply with notations shown. If such qualified review is shown or if the shop drawings are not reviewed by Engineer or if resubmission is so directed, Contractor shall make any corrections required or indicated by Engineer at Contractor's expense.
 - (1) Any shop drawing or correction indicated on a shop drawing which does not conform to the Contract Documents shall be submitted as a change order and approved, as required under Section 14, of the General Conditions, prior to performing the changed work.
 - (2) Number of copies of shop drawings and other submittals required will be established at the Pre-construction Conference if more than three are required. Contractor shall bear cost of reproducing copies of shop drawings required by all concerned. In lieu of prints, a sepia may be required.

By approving shop drawings and samples, Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, or will do so, and that he has checked and coordinated each shop drawing and sample with requirements of the Work and of the Contract Documents.

No work requiring a shop drawing or sample submission shall be commenced until submission has been approved by Engineer.

Samples.

- (a) Where specified or required, Contractor shall submit samples to Engineer together with specification material, affidavits, and other documentation as may be required by Engineer.
- (b) It is Contractor's specific responsibility to ascertain that samples submitted have been checked and approved by him.
- (c) Cost of samples, together with transportation, delivery, and any other costs, shall be borne by Contractor. Samples shall be submitted in duplicate and one of each sample shall be retained in the office of Engineer until completion of the Project.

- (d) Where samples are specifically required to be submitted for approval, no work involving the sampled materials shall proceed until written approval has been obtained from Engineer.

Review By Engineer.

- (a) Review of shop drawings by Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Review of such drawings will not relieve Contractor of responsibility for any error which may exist in the submittals.

1.6 SCHEDULE OF VALUES. A schedule of dollar values shall be submitted to Engineer and Owner not less than twenty (20) days prior to first request for payment and shall be a condition precedent to processing first payment. Schedule of values shall be submitted on Owner's standard payment request form. This breakdown shall follow the trade Divisions of the Specification and each item thereunder shall include its pro rata part of overhead and profit so the sum of the items will equal the contract price. Breakdown will correspond exactly to items of work in the progress schedule including work of sub-contractors.

SECTION 104

MATERIAL & EQUIPMENT

1.1 MATERIAL & EQUIPMENT.

Materials incorporated into the project shall be new, except as otherwise indicated in the Specifications, of specified quality, and furnished in sufficient quantity to facilitate proper and speedy execution of the Work.

Contractor shall, if required, furnish evidence of the quality of any materials.

Materials not meeting requirements of the Contract Documents shall be removed from Project by Contractor without expense to Owner.

1.2 DELIVERY, STORAGE, & HANDLING.

Materials shall be delivered to the site in original packaging with labels and trademarks intact, and such labels and trademarks shall remain intact until used.

Contractor shall confine his apparatus, storage of materials, and operations of his workmen to limits indicated by law, ordinances, and permits and shall arrange and maintain parking of vehicles and storage of materials in an orderly manner leaving all walks, driveways, roads, and entrances, unencumbered.

All equipment on site shall be protected from physical damage and from the elements by measures satisfactory to Engineer. All rotating equipment shall be rotated four turns once each week during construction.

1.3 PRODUCT OPTIONS & SUBSTITUTIONS.

When several materials are specified in the Contract Documents by name for one use, Contractor may select any one of those so specified. The mixing of several products specified by name for one use is prohibited.

Wherever an item or class of material is specified exclusively by trade name, name of maker, or by catalog reference, use such item only unless Engineer's approval for a substitution is secured by Addendum a minimum of 10 days before bid opening time. Items and material not specified in the Contract Documents and installed in the Work shall be removed and replaced by specified items and material at no additional cost to Owner and for no additional time added to Contract.

Wherever words "Approved by", "Satisfactory to", "submitted to", "inspected by," or similar phrases are used in this Specification, they shall be understood to mean that the material or item referred to shall be approved by, be satisfactory to, submitted to, or

inspected by Engineer.

SECTION 105

CONTRACT CLOSEOUT

1.1 FINAL CLEANING.

Contractor shall, at completion of work, remove all rubbish from under and about the Construction Site.

If Contractor fails to clean up, Owner may do so and the cost thereof will be charged to the Contractor.

1.2 PRE-SUBSTANTIAL COMPLETION, SUBSTANTIAL COMPLETION, & FINAL INSPECTIONS

Pre-substantial Completion Inspection.

- (a) Upon Contractor's request, Engineer (and his consultants as appropriate) will make an inspection and furnish to Contractor a list of items to be corrected by Contractor.
- (b) Upon correction of these items, Engineer will arrange a substantial completion inspection to include Owner.

Substantial Completion Inspection.

- (a) At the substantial completion inspection, unless building is rejected, Owner, Engineer, and Contractor will execute a Certificate of Substantial Completion which states the dates for -
 - (1) Commencement of warranties,
 - (2) Final completion inspection,
 - (3) Modifications to the amount assessed for liquidated damages.
- (b) After inspection, Engineer will furnish final list of items to be corrected.

Final Inspection.

- (a) Final Completion Inspection will ensure that all deficiencies noted at the substantial completion inspection have been corrected according to terms of the substantial completion certificate.
- (b) The contractor shall obtain signed release waivers from all suppliers and subcontractors before final payment will be authorized.

- (c) When all items have been corrected, Engineer will issue a certificate authorizing final payment.
- (d) If all items have not been corrected as agreed, Owner may elect to complete the Work under provisions of Section 16 of the General Conditions.

1.3 PROJECT RECORD DOCUMENTS. Contractor shall deliver to Engineer prior to substantial completion inspection:

- (a) Accurate "as built" drawings and letters of the work if the work is constructed in any way at variance to that shown on Contract Documents. "As built" drawings or descriptive letters for other work will be supplied if requested.
- (b) Certificates of inspection and of occupancy that may be required by authorities having jurisdiction over the Work.

1.4 OPERATING & MAINTENANCE DATA. Before execution of the Certificate of Substantial Completion, Contractor shall furnish the operating instructions and maintenance manuals as called for in Contract Documents.

1.5 WARRANTIES & BONDS.

When written guarantees beyond one year after substantial completion are required of any section of the Work, Contractor shall secure such guarantees and/or warranties properly addressed and signed and in favor of Owner. These documents shall be delivered to Engineer upon substantial completion of Contractor's work and prior to execution of Certificate of Substantial Completion.

Delivery of guarantees and warranties shall not relieve Contractor from any obligation assumed under any other provisions of his contract.

Nothing herein intends or implies that guarantees and/or warranties shall apply to work abused or neglected by Owner.

SECTION 106

MOBILIZATION

DESCRIPTION

1.1 GENERAL. This item of work is provided to cover the Contractor's cost for general and miscellaneous responsibilities and operations not normally attributable to, or included in, any other single bid schedule item. This shall include, but not necessarily be limited to, work, described or enumerated in this section under the following subsections.

CONSTRUCTION

2.1 MOVING TO AND FROM JOB SITE. This shall include the Contractor's preliminary arrangements for starting construction operations, work schedules, and transportation of equipment and personnel to and from the project.

2.2 TEMPORARY FACILITIES.

Field Office. The Contractors of each schedule shall provide and maintain a temporary field office on the project or within 5 miles of the project limits.

Sanitary Facilities for Construction Workers. The Contractor shall provide, for all his workers on the project, adequate and reasonably convenient uncontaminated drinking water supply and temporary toilet facilities. All facilities shall comply with the Utah Safety and Health Act.

Utilities for Construction Operations. The Contractor shall make arrangements for, secure and pay for, any and all utility supplies such as electric power, water, natural gas or telephone that may be required for prosecution of the work.

Temporary Lighting. The Contractor shall provide all temporary lighting required for prosecution of his work and for employee and public safety. As a minimum, lighting levels during working hours shall meet the requirements of U.O.S.H.A. Subsection 1926.56 Illumination.

Heating and Ventilating. The Contractor shall provide any and all heating and ventilating equipment required to assure a safe environment for workers and to prevent damage to the project facilities from freezing or excessive temperature.

2.3 PUBLIC SAFETY AND TRAFFIC CONTROL. The cost of all safety and traffic control devices shall be included in the lump sum bid price for "Mobilization."

2.4 RESTORATION OF CONSTRUCTION SITE. The cost of all clean-up work as

specified in the following sections shall be included in the Bid Schedule lump sum price for "Mobilization."

2.5 TEMPORARY UTILITIES. The Contractor shall arrange for, secure and pay directly any and all temporary utility supplies he may require for prosecution of his work. The cost of such utilities shall be included in the lump sum price of "Mobilization."

2.6 BONDS AND PERMITS. The Contractor shall secure all bonds and permits required for the prosecution of the work, the cost of which shall be included in the lump sum price of "Mobilization."

BASIS OF PAYMENT

3.1 PAYMENT. Payment for this work will be made at the contract unit price for "Mobilization". Six payments will be made in accordance with the following schedule:

- (1) When 5% of the original contract amount is earned, 25% of the amount bid for mobilization, or 2 1/2% of the original contract amount, whichever is lesser, will be paid.
- (2) When 10% of the original contract amount is earned, 50% of the amount bid for mobilization, or 5% of the original contract amount, whichever is lesser, will be paid.
- (3) When 25% of the original contract amount is earned, 60% of the amount bid for mobilization, or 6% of the original contract amount, whichever is lesser, will be paid.
- (4) When 65% of the original contract amount is earned, 90% of the amount bid for mobilization, or 9% of the original contract amount, whichever is lesser, will be paid.
- (5) When 80% of the original contract amount is earned, 100% of the amount bid for mobilization, or 10% of the original contract amount, whichever is lesser, will be paid.
- (6) Upon completion of all work on the contract any unpaid amount of the original contract amount for mobilization will be paid.

Nothing herein shall be construed to limit or preclude partial payments, otherwise provided for by the contract.

SECTION 107

METHOD OF MEASUREMENT & BASIS OF PAYMENT

1.1 General. All work will be measured by the units indicated in the bid schedule. Payment will be considered completed compensation for all design, labor, material, materials, and equipment necessary to complete each item in accordance with the Contract Documents, Specifications, and Drawings.

2.1 Bid Items.

Bid Item #1- Mobilization

The City of St. George requires the Contractor to secure an encroachment permit for work in the city right-of-way. The Contractor shall submit for review and approval his proposed signage and traffic routing plan with his application for the encroachment permit. The Contractor shall follow all requirements of the encroachment permit. The cost to obtain an encroachment permit shall be included in the lump sum bid price for "Mobilization".

All temporary construction signs and flagging shall be according to the Manual on Uniform Traffic Control Devices (MUTCD), latest edition. The cost of all safety and traffic control devices shall be included in the lump sum price bid for "Mobilization".

The Contractor shall coordinate the relocation of existing utilities with the appropriate utility company. The cost to coordinate relocation of existing utilities shall be considered incidental to the project and shall be included as part of the lump sum price bid for "Mobilization".

Payment for this work will be made at the contract unit price for "Mobilization". Six payments will be made in accordance with the following schedule:

- (1) When 5% of the original contract amount is earned, 25% of the amount bid for mobilization, or 2 1/2% of the original contract amount, whichever is lesser, will be paid.
- (2) When 10% of the original contract amount is earned, 50% of the amount bid for mobilization, or 5% of the original contract amount, whichever is lesser, will be paid.
- (3) When 25% of the original contract amount is earned, 60% of the amount bid for mobilization, or 6% of the original contract amount, whichever is lesser, will be paid.
- (4) When 65% of the original contract amount is earned, 90% of the amount bid for mobilization, or 9% of the original contract amount, whichever is lesser,

will be paid.

- (5) When 80% of the original contract amount is earned, 100% of the amount bid for mobilization, or 10% of the original contract amount, whichever is lesser, will be paid.
- (6) Upon completion of all work on the contract any unpaid amount of the original contract amount for mobilization will be paid.

Nothing herein shall be construed to limit or preclude partial payments, otherwise provided for by the contract.

Bid Item #2- Excavation, Earthwork, and Grading for Roadway and Parking Lot

This item shall consist of all excavation, over excavation, removal of organic materials, scarifying and re-compaction on-site materials, material placement, and material compaction necessary to construct a roadway and parking lot areas at the location, grade, and manner specified in the Specifications and Contract Documents, and as shown in the Construction Drawings. This item shall include, but not be limited to, all excavation, placement, compaction, over excavation, removal of organic materials, scarification, and re-compaction of sub-grade materials.

Measurement for payment of this item shall be on a lump sum basis under Bid Item #2 of the Bid Schedule.

Bid Item #3- Removals

This bid item is for the removal of existing curb, gutter, sidewalk, and asphalt pavement as shown on the construction drawings. The existing curb, gutter, and sidewalk that is to be removed shall be removed to the nearest joint, such that the new curb, gutter, and sidewalk can connect to the existing at a clean joint. All asphalt that is to be removed shall be saw-cut at the location where the new asphalt will tie into the existing such that the new asphalt can tie into a straight, clean saw-cut line.

The unit price for this item shall consist of all materials, equipment, and labor necessary to remove existing curb, gutter, sidewalk, and asphalt as required on the plans. This shall include, but not be limited to; saw-cutting, hydraulic hammering, removal, export, and proper disposal.

Measurement for payment of this item shall be on a lump sum basis under Bid Item #3 of the Bid Schedule.

Bid Item #4 – Install HB30-7 Curb, Gutter, and Sidewalk

This bid item is for the installation of HB30-7 curb, gutter, and sidewalk along the west side of the new roadway.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install new curb, gutter and sidewalk. This shall include, but not be limited to; excavation; grading; sub-grade preparation; import and compaction of 6" of untreated Type II road base; forming and constructing curb, gutter and sidewalk; and other items as required to provide complete and functioning curb, gutter and sidewalk per St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual linear feet of curb, gutter, and sidewalk installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #4.

Bid Item #5- Construct 5' Sidewalk

This bid item is for the construction of a 5 foot wide sidewalk along the roadway. The unit price for this item shall consist of all materials, labor, and equipment necessary to construct a 5 foot wide sidewalk that meet the requirements of the City of St. George Construction Standards. This shall include, but not be limited to; excavation, grading, sub-grade preparation, import and compaction of untreated road base, forming and construction of concrete sidewalk, and other items as required to provide a complete and functioning sidewalk.

Measurement for payment of this item shall be based on the actual number of lineal feet of sidewalk constructed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #5.

Bid Item #6- Construct 4' Concrete Waterway

This bid item is for the installation of a 4' wide concrete waterway at various parking lot entrances.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install a new concrete waterway. This shall include, but not be limited to; excavation; grading; sub-grade preparation; import and compaction of 6" of untreated Type II road base; forming and constructing concrete waterway; and other items as required to provide complete and functioning waterway per St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual linear feet of waterway installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #6.

Bid Item #7- Install ADA Compliant Handicap Access Ramps

This bid item is for the construction of ADA compliant handicap access ramps at various locations at parking lot entrances and through out the parking lot.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install a new concrete handicap access ramp. This shall include, but not be limited to; excavation; grading; sub-grade preparation; import and compaction of 6" of untreated Type II road base; forming and constructing concrete handicap ramp; and other items as required to provide complete and functioning concrete handicap ramp per St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual number of handicap access ramps installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #7.

Bid Item #8 and #12 - Furnish and Install Untreated Type II Roadbase

This item is to furnish and install new untreated Type II road base as part of the roadway and parking lot improvements to the extent and thickness as shown on the construction drawings.

The unit price bid for this items shall consists of all materials, labor, and equipment necessary for installation of the untreated road base along the new roadway, and in the new parking lot area as shown on the construction drawings. This item shall include, but not be limited to import, grading, placement, and compaction of road base to meet the St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual square footage of road base installed along the roadway and in the parking lot. Payment for this items shall be at the contract unit price as specified in the Bid Schedule under bid item #6 and item #10.

Bid Item # 9 and #13- Furnish and Install Asphalt Pavement

This item is for the installation of asphalt pavement along new roadway and within the new parking lot area. The asphalt mix design shall be a ¾" non-rutting mix per St. George City Standards and Specifications.

The unit price bid for this item shall consist of all materials, labor and equipment necessary for the installation of asphalt pavement to the extend and thickness as identified on the

construction drawings. This bid item shall include, but not be limited to, import, placement, and compaction of asphalt pavement to meet the St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual square footage of asphalt pavement installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #7 and item #11.

Bid Item #10 -# 11 – Install On-Site Collecting or Shedding Curb And Gutter With Road Base

This bid item is for the installation of on-site collecting or shedding type curb and gutter along in the parking lot area as shown on the construction drawings.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install on-site collecting or shedding curb and gutter. This shall include, but not be limited to, grading, preparation of subgrade, import and compaction of 6" thick untreated Type II road base, forming and constructing curb and gutter, installation of expansion and control joints, and export of excess native material. This shall also include backfill with native material behind curb and gutter to match existing grade and to support the new curb and gutter. The curb and gutter shall meet and be installed per the St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual linear feet of on-site collecting or curb and gutter actually installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid items #10 and #11.

Bid Item #14- Construct 4" Concrete Sidewalk

This bid item is for the installation of a 4" thick concrete sidewalk at various locations throughout the project.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install a new concrete sidewalk. This shall include, but not be limited to; excavation; grading; sub-grade preparation; import and compaction of untreated Type II road base; forming and constructing concrete sidewalk; and other items as required to provide complete and functioning sidewalk per St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual square footage of sidewalk installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #14.

Bid Item #15 – Construct 24" Waterway

This bid item is for the construction of 14" concrete waterway as shown on the construction drawings.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to construct a concrete waterway. This shall include, but not be limited to, grading, preparation of sub-grade, import and compaction untreated Type II road base, forming and constructing curb, installation of expansion and control joints, and export of excess native material. The waterway shall meet and be installed per the St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual linear feet of waterway actually installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid items #15.

Bid Item #16- Install ADA Compliant Handicap Access Ramps

This bid item is for the construction of ADA compliant handicap access ramps between the parking lot and the Dixie Center sidewalk.

The unit price bid for this item shall consist of all materials, labor and equipment necessary to install a new concrete handicap access ramp. This shall include, but not be limited to; excavation; grading; sub-grade preparation; import and compaction of untreated Type II road base; forming and constructing concrete handicap ramp; and other items as required to provide complete and functioning concrete handicap ramp per St. George City Standards and Specifications.

Measurement for payment of this item shall be based on the actual lineal feet of handicap access ramps installed. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #16.

Bid Item #17- Provide Parking Lot and Street Lighting System

This bid item is for the construction of a parking lot and roadway lighting system as shown on the plans. The electrical contract must be pre-qualified through the City of St. George Energy Services Department to work on Primary or high voltage systems.

The unit price bid for this item shall consists of all materials, labor, and equipment necessary to provide a electrical system for the parking lot lighting and the roadway lighting

as shown in the construction drawings. All electrical work shall be in compliance with the City of St. George Construction Standards. This item shall include, but not be limited to: all trenching, excavation, backfilling, conduits, conductors, transformers, electrical enclosures, junction boxes, secondary boxes, connection to existing electrical systems, relocation of pedestals, and all other items incidental to the construction of the parking lot and street lighting systems.

Measurement for payment of this item shall be based on a lump sum basis at the lump sum price as specified in the Bid Schedule under bid item #17.

Bid Item # 18- Furnish and Install Street Lights

This bid item is for furnishing and installing street lights along the new roadway at the locations specified in the construction drawings, and in accordance with the City of St. George Construction Standards.

The unit price bid for this item shall consist of all materials, labor, and equipment necessary to furnish and install street lights as specified.

Measurement for payment of this item shall be based on the actual number of street lights furnished and installed at the unit price specified under bid item #18 of the Bid Schedule.

Bid Items #19- Furnish and Install Parking Lot Lights

This bid item is for furnishing and installing parking lot lights in the new parking lot at the locations specified in the construction drawings, and in accordance with the City of St. George Construction Standards.

The unit price bid for this item shall consist of all materials, labor, and equipment necessary to furnish and install the parking lot lights as specified.

Measurement for payment of this item shall be based on the actual number of parking lot lights furnished and installed at the unit price specified under bid item #19 of the Bid Schedule.

Bid Item # 20- Landscaping

This bid item is for installation of all landscaping as shown in the landscaping plan specified in the project specifications, including all such items appurtenant to a functioning landscape system.

The lump sum bid price shall consist of all labor, materials, and equipment necessary to provide all landscaping as required on the landscape plans and specified in the project specifications, and shall include, but not be limited to all irrigation piping, valves, control

wiring, irrigation controller, connection to existing irrigation system, connection to new irrigation source, drip irrigation systems, sub-grade drainage systems, import top soil, furnish and installation of plants, trees, and shrubs, ground cover materials, hardscape materials, and all other items required to provide a function landscape system.

The contractor will be required to provide a schedule of values itemizing the cost of each major item identified in the landscape plans.

Measurement for payment of this items shall be based on a lump sum bid price specified in the Bid Schedule under bid item #20.

Bid Items #21- Erosion Control

This bid item is to furnish and install erosion control protection as shown on the construction drawings. If the inlet protection that is installed is not functioning correctly or becomes unsuitable for its application as the project progresses, the Contractor shall be required to remove and replace the inlet protection at the expense of the Contractor. Therefore, as a part of this bid item, it is recommended that the Contractor use care in selecting inlet protection measures and accounting for any changes that might be required to the inlet protection as construction progresses.

The unit price for this item shall consist of all materials, labor and equipment necessary to furnish and install erosion control protection. This shall include, but not be limited to, furnishing and installing approved inlet protection; removal of inlet protection at completion of project; and other items as required to provide complete and functioning erosion control measures. The Contractor shall be required to provide and to obtain approval for a Storm water Pollution Prevention Plan (SWPPP) prior to beginning work on this project. The SWPPP is not part of this bid item but shall be paid for as part of bid item #1, "Mobilization".

Measurement for payment of this item shall be lump sum. Payment for this item shall be at the lump sum price as specified in the Bid Schedule under bid item #21.

Bid Item #22- Parking Lot Striping

This bid item is to provide parking lot striping as shown on the construction plans and in accordance to City of St. George Construction Standards. This item is for striping of both the new parking lot, as well as the parking lot directly east of the Dixie Center that where new asphalt is placed. The striping shall consist of parking lot stalls, handicap stall markings, and other markings associated with the handicap stalls as is required by ADA regulations.

The unit price bid for this item shall consist of all materials, labor, and equipment necessary to stripe the parking lot areas in accordance with the plans and specifications. Method of

measurement and basis of payment shall be based on a lump sum bid price as specified in the Bid Schedule under bid item #22.

Bid Item #23- Connection to Existing Storm Drain Catch Basin

This bid item is for the connection to the existing storm drain catch basin. The lump sum bid price for this item shall include all labor, equipment, and labor necessary to connect to the existing storm drain catch basin, including, but not limited to; excavation, concrete core drilling, grouting, and trench backfilling.

Measurement for payment of this item shall be on a lump sum basis as specified in the Bid Schedule, under bid item # 23.

Bid Items #24- Install 12" Diameter ADS Storm Drain Pipe

These bid items are for furnishing and the installation of storm drain piping.

The unit price bid for these items shall consist of all materials, labor and equipment necessary for furnishing and installation of the ADS or concrete storm drain pipe. This shall include, but not be limited to; excavation; import, backfill and compaction of bedding material; installation of storm drain pipe; backfill and compaction of storm drain pipe; export of excess material; and other items as required to provide a complete and functioning storm drain system per the St. George City Standards and Specifications.

Measurement for payment of these bid items shall be based on the actual linear footage of storm drain pipe installed. Payment for these bid items shall be at the contract unit prices as specified in the Bid Schedule under bid items #24

Bid Items #25- Install 12" Diameter Reinforced Concrete Storm Drain Pipe

These bid items are for furnishing and the installation of storm drain piping.

The unit price bid for these items shall consist of all materials, labor and equipment necessary for furnishing and installation of the ADS or concrete storm drain pipe. This shall include, but not be limited to; excavation; import, backfill and compaction of bedding material; installation of storm drain pipe; backfill and compaction of storm drain pipe; export of excess material; and other items as required to provide a complete and functioning storm drain system per the St. George City Standards and Specifications.

Measurement for payment of these bid items shall be based on the actual linear footage of storm drain pipe installed. Payment for these bid items shall be at the contract unit prices as specified in the Bid Schedule under bid items #25

Bid Item #26 – Furnish and Install Concrete Storm Drain Catch Basin

This bid item is to furnish and install a new concrete storm drain catch basins at locations specified on the construction drawings.. The inlet grate shall be a D&L Supply Rectangular Grate and Frame or approved equivalent. The concrete catch basin shall be designed for HS-20 loading and to meet the St. George City Standards and Specifications. The unit price bid for this item shall consist of all materials, labor and equipment necessary to design, furnish and install the concrete storm drain catch basin. This shall include, but not be limited to; import and compaction of Type II untreated road base below the catch basin; forming and constructing the catch basin; installation of the catch basin, frame and grate; connection of the new storm drain line to the new catch basin; and other items as required to provide a complete and functioning catch basin per St. George City Standards and Specifications.

Measurement for payment of this item shall be for one concrete storm drain catch basin installed at locations specified on the construction drawings. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #26.

Bid Item #27- Saw-cut, Remove, and Replace Asphalt Pavement

This bid item is to saw-cut, remove, and replace a section of existing pavement located in 1670 South Street where the irrigation line connection is made. The unit price bid for this item shall consist of all materials, labor, and equipment necessary for the saw-cutting, removal, and replacement of the existing asphalt to meet the City of St. George Standards and Specifications, and shall include, but not be limited to; saw-cutting and removal of existing asphalt, sub-grade preparation, import and compaction of road base material, asphalt pavement, and other items as required to provide a complete and functioning asphalt patch.

Measurement for payment of this item shall be based on the actual number of square feet of asphalt that is patched. Payment for this item shall be at the contract unit price as specified in the Bid Schedule under bid item #27.

SECTION 108

NON-PAYMENT ITEMS

1.1 NON-PAYMENT ITEMS. The Contractor shall not be paid for the following items. The costs associated with these items should be included in the unit prices for other items on the Bid Schedule.

- A. All materials, labor and equipment required to excavate, uncover, remove, replace, or reconstruct any facility or improvement that was not properly inspected and tested at the time of installation as required by these specifications.
- B. All construction watering and dust control costs.
- C. All items required to be finished on the final inspection "Punch List".
- D. All removal and replacement of concrete, road base or bituminous materials required due to faulty materials or workmanship.
- E. Repairs to any existing utilities including power lines, water laterals, gas lines, irrigation lines, irrigation ditches, culverts, cable t.v., mail box standards, etc.
- F. Damage to public or other physical facilities resulting from the contractor's negligence or construction operations, etc.
- G. Restoration of existing surface improvements.
- H. Saw-cutting any existing asphalt required to complete the project.
- I. Coordination and scheduling delivery of the construction materials with material suppliers and inspection of the materials upon delivery.
- J. All costs associated with the removal and replacement of materials that are unable to meet testing or warranty requirements. This includes, but is not limited to, excavation, disposal, replacement, shipping and installation costs.
- K. All costs associated with providing quality control inspection and testing required by the City including preparation of a written report to summarize and certify results.
- L. All costs associated with providing traffic control during construction.
- M. All costs associated with moving and resetting signs, mail box standards, etc.

SPECIAL PROVISIONS

Standard Specifications

The City of St. George Standard Specifications for Design and Construction, latest edition, including all addenda shall govern the construction of this contract except as modified in these special provisions and the general conditions of the contract provided heretofore. The Contractor shall have a complete copy of the above mentioned specifications on the project at all times.

In case of conflict between the City of St. George Standard Specifications for Design and Construction and the general conditions, special provisions, modifications, and additions included in these agreements, the special provisions, modifications and additions shall govern.

Technical Specifications

Section 328400- Planting Irrigation

Section 329300- Plants

Section 334600- Sub-Drainage

SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. City of St. George Standard Specifications for Construction, latest edition.

1.2 SUMMARY

- A. The work covered by this section consists of furnishing all labor, materials, equipment and supplies in performing all operations in connection with planting irrigation work in strict accordance with this section and applicable drawings. Work includes trenching, placement of irrigation pipe, mainline, lateral line pipe and emitters, backfilling trenches, electrical connection for controllers and valves, coverage adjustments, programming, start up and maintenance.
- B. Any minor items of labor or materials not specifically noted on the drawings or specifications; but necessary for the proper completion of the work, shall be considered incidental to and are to be included in the work.
- C. Work under this section shall include coordination of all work with all other sections of these specifications.
- D. Section Includes:
 - 1. Piping
 - 2. Filter Device
 - 3. Manual valves
 - 4. Pressure-reducing valves
 - 5. Automatic control valves
 - 6. Miscellaneous piping specialties
 - 7. Quick couplers
 - 8. Drip irrigation specialties
 - 9. Controllers
 - 10. Boxes for automatic control valves

1.3 DEFINITIONS

- A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

- C. Final Acceptance: When the City of St. George accepts the project as fully complete and takes ownership.
- D. Manifold Piping: Downstream from water meter to ball valve.
- E. Main Line Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- F. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Irrigation Design: Design 100 percent head to head coverage irrigation system using performance requirements and design criteria indicated.
 - 1. Refer to Section 329300 Plants for agronomic soil test requirements. Provide a comprehensive agronomic soils test listing soil characteristics, texture, particle size, structure, density, moisture content and infiltration rate.
- C. Installed Coverage Rate: 100%
 - 1. Irrigation designer to certify that a minimum 80% distribution uniformity level has been designed for single stream rotors and a minimum 70% distribution uniformity level has been designed for fixed spray heads.
 - 2. After construction the City shall provide a 3rd party water audit by a qualified irrigation auditor to verify that a minimum 80% distribution uniformity level has been achieved for single stream rotors and a minimum 70% distribution uniformity level has been achieved for fixed spray heads.
- D. Minimum Working Pressures: The irrigation designer needs to verify with the City of St. George Irrigation Department, Jeff Lance 435-627-4844 a current pressure reading in the vicinity of the proposed point of connection. The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
 - 1. Irrigation Main Piping: **150 psig**
 - 2. Circuit Piping: **100 psig**

1.5 SUBMITTALS

- A. Refer to plan submittal requirements and plan review process for requirements.

- B. Submit technical data of all required products indicating all sizes, options, etc.
- C. Submit technical data as requested for approval of proposed equivalent products where permitted.
- D. Zoning Chart: Show each irrigation zone and its control valve with a separate color designation on an 11x17 size, laminated (3 ml) exhibit. These charts will be stored in the controller enclosure.
- E. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- F. Operation and Maintenance Data: As part of the close-out procedures all operation and maintenance manuals shall be provided to the City's Park Planning inspector. (controllers, automatic control valves, etc.)

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: City Certified Licensed Landscape Contractor The Irrigation Contractor shall provide a superintendent for this project who has been certified by a City of St. George approved certification program to install irrigation systems, meet state and local license, insurance and bonding requirements Per Section 10-25-3 (B1) of the City of St. George Landscape Ordinance, and is able to show proof of such upon demand.
- B. Irrigation Auditor: Irrigation Association (IA) certified water auditor.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8 PROJECT COORDINATION

- A. Coordinate with other trades to insure sleeving is placed in all locations required and as specified.
- B. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and

then only after arranging to provide temporary water service according to requirements indicated:

1. Notify City Water Department Inspector no fewer than five days in advance of proposed interruption of water service.
 2. Do not proceed with interruption of water service without City Water Department Inspector's written permission.
- C. Pressure (PSI) Verification: verify that design/installation pressures at the point of connection are adequate.
- D. Utility Locate: Notify Blue Stakes (800) 6662-4111 locating service before work begins.

1.9 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents as part of the closeout procedure.
1. Spray Sprinklers: Equal to **five** percent of amount installed for each type and size indicated, but no fewer than **five** units.
 2. Bubblers: Equal to **ten** percent of amount installed for each type indicated, but no fewer than ten units.
 3. Emitters: Equal to **ten** percent of amount installed for each type indicated, but no fewer than ten units.
 4. ¼" Distribution Tubing: Equal to **ten** percent of total length installed but not less than **100 feet**.
 5. ¾" Blue Stripe® Polyethylene Hose: Equal to **ten** percent of total length installed for each type and size indicated, but not less than **100 feet**.
 6. In-line Emitter Tubing: Equal to **ten** percent of total length installed for each type and size indicated, but not less than **100 feet**.

1.10 WARRANTY

- A. Contractor shall provide a one (1) year warranty from the Date of Final Acceptance.

1.11 INSPECTIONS

- A. The City of St. George Park Planning Division will make irrigation system inspections as followed where applicable to items specified for this project. Contractor must get approval before proceeding with the next work task or risk removal and replacement of work installed without additional compensation.
1. Sleeving location, depth, type and size.
 2. Permanent sleeve marking system in place.

3. Irrigation manifold
4. Mainline depth, type, marking and size (open trench required)
5. Wire connections, size, depth, color
6. Mainline connections and thrust blocks
7. Hydrostatic test as specified
8. Box supports, markings, valve ID tags
9. Controller type, stations, location, enclosure
10. Controller installation, power connection, certification
11. Lateral line depth, type and size (open trench required)
12. Head and emitter types, spacing and swing joints
13. Water audit
14. Turn over extra equipment, warranties, as-builts (Record Drawings)

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Required Product: Subject to compliance with requirements.
- B. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
- C. PVC Pipe: ASTM D 1785, PVC 1120 compound, **Schedule 40**.
 1. PVC Socket Fittings: ASTM D 2466, **Schedules 40 and 80**.
 2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
 3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.
- D. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, **SDR 21**.
 1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
 2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.2 PIPING SCHEDULE

- A. Install components having pressure rating equal to or greater than system operating pressure.
- B. Piping in control-valve boxes and aboveground shall be joined with unions instead of joints indicated.
- C. Purple pipe shall be used for irrigation systems using reclaimed or secondary water source.

- D. Underground irrigation main piping, **NPS 5 and greater** , shall be the following:
 - 1. **Schedule 40**, PVC pipe and socket fittings; and solvent-cemented joints.
- E. Underground irrigation main piping, **NPS 4 and smaller**, shall be the following:
 - 1. **Schedule 40**, PVC pipe and socket fittings, and solvent-cemented joints.
 - 2. Schedule 80, PVC pipe; Schedule 80, threaded PVC fittings; and threaded joints.
- F. Circuit piping, **NPS 2-1/2 to NPS 4**, shall be the following:
 - 1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
- G. Circuit piping, **NPS 2 and smaller**, shall be one of the following:
 - 1. PE, controlled OD pipe; PE butt, or PE socket-type fittings.
 - 2. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
- H. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.
 - 1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.
- I. Drain piping shall be **one of** the following:
 - 1. SIDR 9, 11.5, or 15, PE, controlled ID pipe; insert fittings for PE pipe; and banded or fastener joints.
 - 2. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.4 SLEEVES

- A. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.

- B. Sleeves shall occur under all sidewalks, driveways, trails, and other paving where irrigation mainlines and/or lateral lines cross. Ends of pipe shall extend a minimum of 12 inches beyond the edge of pavement and be marked with rebar stakes, paint and tracer wire shall run the length of the sleeve. Irrigation mainline and lateral lines shall not run under large patio areas or expanses of concrete paving but shall be routed around these areas. Controller wires shall run in a separate sleeve from the mainline.

2.5 MANUAL ISOLATION VALVES

- A. Required Product: Subject to compliance with requirements, provide:
- B. Plastic Ball Valves:
 - 1. KBI (King Brothers Industries) or approved equivalent.
 - a. Commercial Ball Valves, Socket or Threaded; Line size.
- C. Bronze Gate Valves:
 - 1. Matco-Norca or approved equivalent.
 - a. Commercial, Model 503; Line size.

2.6 PRESSURE-REDUCING VALVES

- A. Water Regulators:
 - 1. Required Product: Subject to compliance with requirements, Wilkins PRV valve.

2.7 WATER FILTER DEVICE

- A. Required Product: Subject to compliance with requirements, Amiad Filtration Systems.
 - 1. 1" to 1 ½" Super Plastic Filter for flow rates from 30 gpm to 66 gpm
 - 2. 2" to 3" Super Plastic Filter for flow rates up to 220 gpm
 - 3. Screen size 200 microns.

2.8 AUTOMATIC CONTROL VALVES

- A. Required Product: Subject to compliance with requirements, Rainbird Corporation.
- B. Mastervalue
 - 1. For culinary water application.
 - a. 100 – PEB Plastic industrial valve for flow rates from 0.25 to 30 gpm.
 - b. 150 – PEB Plastic industrial valve for flow rates from 30 to 75 gpm.

- c. 200 – PEB Plastic industrial valve for flow rates from 75 to 125 gpm.
- 2. For reclaimed water application.
 - a. Provide the purple flow control handles – PESB-NP-HAN1 (1”), PESB-NP-HAN2 (1½” and 2”)
 -

C. Automatic Control Valves for Drip Application

- 1. Control Zone Kit; Commercial grade
 - a. XCZ-100-B-COM: 1” PESB valve with 1” basket filter, 40 psi Pressure Regulator and 1” Ball Valve for flow rates from 3 to 20 gpm or
- 2. 100-PESB-R for flow rates from 0.25 to 30 gpm and 1” Pressure Regulator – PSI-M40X-100 (for systems with an Amiad filter installed upstream.)

2.9 FLOW METER

- A. Required Product: Subject to compliance with requirements, Badger Corporation.
 - 1. IR 250B-1.5 (1 1/2”)
 - 2. Provide twisted pair cable connection suitable for direct bury.

2.10 QUICK COUPLERS

- A. Required Product: Subject to compliance with requirements, provide Nelson
 - 1. Nelson Quick Coupling Valve – One Piece
 - 2. Locking-Top Option: Vandal-resistant locking feature. Include **two** matching key(s).
 - 3. For non-potable water applications install lavender vinyl cover.

2.11 MANUAL DRAIN VALVES

- A. Required Product: Subject to compliance with requirements provide:
 - 1. KBI (King Brothers Industries) or approved equivalent.
 - a. Commercial Ball Valves, Socket or Threaded; Line size.

2.12 DRIP IRRIGATION SPECIALTIES

- A. Required Product: Subject to compliance with requirements, provide Rainbird Corporation, Toro or Netafim.
- B. Point Source Emitters:
 - 1. Distribution Tubing: 1” Toro Blue Stripe® Polyethylene Hose and Rainbird ¼” PT-025
 - 2. Drip Emitter: Rainbird Xeri-Bug™ XB-20PC barb inlet
 - 3. Tubing Stake: Rainbird TS-025

4. Diffuser Bug Cap: Rainbird DBC-025

C. Drip Tubes with In-line Emitters:

1. Dripline: Toro 5/8" Drip In® PC Brown Dripline T-PCB1810-12 or Netafim TLDL9-12

D. Air Relief Valves: Rainbird AR Valve Kit. Brass or plastic housing, with corrosion-resistant internal parts.

E. Vacuum Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

2.13 CONTROLLERS

A. Required Product: Subject to compliance with requirements, The Toro Company.

B. Description:

1. Sentinel® Controller – SSAK Sentinel Satellite Assembly with keypad, electric 24 V ac, narrow band communication, sensor capable, and surge protection.

a. Station count - 24

b. Cabinet enclosure type:

1) PP1 – plastic pedestal mount for exterior (large)

a) Concrete Base: Reinforced concrete not less than 36 by 24 by 4 inches thick and 6 inches greater in each direction than overall dimensions of controller. Include opening for wiring.

2. Sentinel® hand held radio – Model SHHR

a. Provide one handheld radio per irrigation controller.

3. Control and Common Wires

a. Provide minimum 18 gauge UF wire and water resistant connections.

2.14 BOXES FOR VALVES AND OTHER COMPONENTS

A. Required Product: Subject to compliance with requirements, Carson Industries or approved equal.

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with adjacent grade.

a. Size: Verify that equipment fits within boxes with sufficient clearance for maintenance purposes.

b. Shape: Round, Square or Rectangle to accommodate below grade irrigation equipment, extra wires, etc.

- c. Cover Material: HDPE
 - 1) Lettering: **IRRIGATION**
 - 2) Provide bolt down cover option.
 - d. Cover Color: Tan to blend with landscape mulch color or colored purple to indicate reclaimed water.
- B. Drainage Backfill: Cleaned angular gravel or crushed stone, graded from 3/4 inch minimum to 1 1/2 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. DEFINITIONS

1. Backfill: Soil material used to fill an excavation.
2. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
3. Final Backfill: Backfill placed over initial backfill to fill a trench.
4. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
5. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

B. SUBMITTALS

1. Product Data: For each type of the following manufactured products required:
 - a. Warning tapes.
2. Samples for Verification: For the following products, in sizes indicated below:
 - a. Warning Tape: 12 inches long; of each color.

C. SOIL MATERIALS

1. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
2. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

D. ACCESSORIES

1. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 2 inches wide, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - a. Blue: Potable water systems.
 - b. Purple: Non-potable water systems.

E. PREPARATION

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
2. Protect and maintain erosion and sedimentation controls during earth moving operations.

F. DEWATERING

1. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
2. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - a. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

G. EXCAVATION FOR TRENCHES

1. Excavate trenches to indicated gradients, lines, depths, and elevations.
2. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
3. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to provide minimum cover over top of underground piping according to the following:
 - a. Irrigation Main Piping: Minimum depth of **24 inches** below finished grade
 - b. Lateral Piping: **18 inches**.
 - c. Distribution Tubing: **2 inches (including mulch)**
 - d. Drain Piping: **at low point in system**
 - e. Air Vac: **at high point in system**
 - f. Sleeves: **24 inches**.
4. Clearance: **8 inches** each side of pipe, sleeve or conduit.

5. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - a. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - b. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
6. Trenches within Tree Driplines- and Plant-Protection Zones:
 - a. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - b. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

H. SUBGRADE INSPECTION

1. Notify Inspector when excavations have reached required subgrade.
2. If Inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

I. UTILITY TRENCH BACKFILL

1. Place and compact backfill in excavations promptly, but not before completing the following:
 - a. Surveying locations or accurately measuring location from adjacent hard surfaces of underground utilities for Record Drawings.
 - b. Testing and inspecting underground utilities.
 - c. Removing trash and debris.
2. Place backfill on subgrades free of mud, frost, snow, or ice.
3. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
4. Place and compact initial backfill of **satisfactory soil**, free of particles larger than **1 inch** in any dimension, to a height of 12 inches over the pipe or conduit.
 - a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
5. Install detectable warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

J. SOIL FILL

1. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
2. Place and compact fill material in layers to required elevations as follows:
 - a. Under grass and planted areas, use satisfactory soil material.
3. Place soil fill on subgrades free of mud, frost, snow, or ice.

K. SOIL MOISTURE CONTROL

1. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content and per geotechnical report specifications.
 - a. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

L. COMPACTION OF SOIL BACKFILLS AND FILLS

1. Compact soil materials to not less than the following percentages of maximum dry unit weight according to **ASTM D 1557**:
 - a. For mainline trenches under hardscape, compact each layer of initial and final backfill soil material to the specified percentage for finish surface.
 - b. For mainline trenches in planting areas, compact each layer of initial and final backfill soil material to 85 percent.

3.2 PIPING INSTALLATION

- A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
- B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- C. Install piping free of sags and bends.
- D. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- E. Install fittings for changes in direction and branch connections.
- F. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.
- G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
- H. Install 36" length expansion loops in control-valve boxes for plastic piping.

- I. Lay piping on solid sub-base, uniformly sloped without humps or depressions.
- J. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
- K. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.
- L. Install piping in sleeves under parking lots, roadways, and sidewalks, and trails in straight lines and without bends. Design lengths are a maximum of 30'.
- M. Install sleeves made of **Schedule 40** PVC pipe and socket fittings, and solvent-cemented joints.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- E. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.
- F. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.

3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.4 VALVE INSTALLATION

- A. Aboveground Valves: Install as components of connected piping system with all associated protective covers.
- B. Throttling Valves: Install in underground piping in boxes for automatic control valves.
- C. Drain Valves: Install in underground piping in 6 inch round valve boxes.

3.5 DRIP IRRIGATION SPECIALTY INSTALLATION

- A. Install freestanding emitters on pipe riser to mounting height indicated.
- B. Install drip tubes with direct-attached emitters on ground.
- C. Install drip tubes with remote-discharge on ground with outlets on off-ground supports at height indicated.
- D. Install off-ground supports of length required for indicated mounted height of device.
- E. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.

3.6 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

- A. Equipment Mounting: Install interior and exterior controllers on wall in specified enclosure.
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Equipment Mounting: Install exterior freestanding controller in specified enclosure on precast concrete bases.
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Install control cable in same trench as irrigation piping and below piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.7 CONNECTIONS

- A. Comply with the City of St. George Standard Specifications for Construction, latest edition for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings shall indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
- C. Connect wiring between controllers and automatic control valves and provide extra wires as follows:
 - 1. Extra wires shall be placed in a separate round pull box as 48" loops.

3.8 IDENTIFICATION

- A. Identify system components using identification tags manufactured by T. Christie with component name and installed per details.
- B. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground mainline piping during backfilling of trenches.

3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Required Tests and Inspections:
 - 1. Backflow Preventer Certification: Provide certification.
 - 2. Mainline: Depth, type, size, marking tape, connections, and thrust blocks prior to backfill.
 - 3. Lateral Line: Depth, type, size, and fittings prior to backfill.
 - 4. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 5. Hydrostatic pressure test on mainline. After installation charge system to 150 psi for three hours and test hydrostatic pressure in the presence of the City's representative.
 - 6. Hydrostatic pressure test on lateral lines. After installation charge system to 100 psi for three hours and test hydrostatic pressure in the presence of the City's representative.
 - 7. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation. Conduct in the presence of the City's representative.
 - 8. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

9. Irrigation Audit. Performed by a 3rd party to verify specified efficiency ratings are achieved, retest failed zones after required adjustments to confirm specified efficiency ratings are achieved.

- C. Any irrigation installation will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports for hydrostatic pressure tests and irrigation audit.

3.10 STARTUP SERVICE

- A. Perform startup service.
 1. Complete installation and startup checks according to manufacturer's written instructions.
 2. Verify that controllers are installed, connected and performance is acceptable to the City Inspector.
 3. Verify that electrical wiring installation complies with manufacturer's recommendation.

3.11 ADJUSTING

- A. Adjust settings of controllers.
- B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with finish grade.
- D. Adjust sprinklers for uniform head to head coverage and eliminate or minimize overspray onto adjacent paved surfaces. Add additional heads as required to achieve coverage at no additional charge to owner.
- E. Make adjustments as required by irrigation audit to meet the specified efficiency requirements.

3.12 CLEAN- UP AND PROTECTION

- A. Flush dirt and debris from piping before installing sprinklers and other devices.
- B. During irrigation installation, keep adjacent paving, construction, and work area clean and in an orderly condition.
- C. Protect any existing or newly planted materials from damage due to irrigation installation operations and operations of other contractor and trades. Maintain

protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

- D. Clean adjacent hard surfaces of dirt, debris, and mud resulting from installation and testing of irrigation system.

3.13 DEMONSTRATION

- A. Train City of St. George Park's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

END OF SECTION 328400

SECTION 329300 – PLANTS

PART 4 - GENERAL

4.1 RELATED DOCUMENTS

- A. City of St. George Standard Specifications for Construction, latest edition.
- B. City of St. George Tree Ordinance, Title 7, Chapter 4.
- C. City of St. George Landscape Ordinance, Title 10, Chapter 25.

4.2 SUMMARY

- A. The work covered by this section consists of furnishing all labor, materials, equipment and supplies in performing all operations in connection with landscape work in strict accordance with this section and applicable drawings. Work includes placement of landscape planting soil, amendments, mulches, pesticides, trees, shrubs, etc.
- B. Any minor items of labor or materials not specifically noted on the drawings or specifications; but necessary for the proper completion of the work, shall be considered incidental to and are to be included in the work.
- C. Work under this section shall include coordination of all work with all other sections of these specifications.
- D. Section Includes:
 - 1. Plants.
 - 2. Planting soils.
 - 3. Tree stabilization.
- E. Related Sections:
 - 1. Division 33 Section 334800 "Subdrainage" for below-grade drainage of landscaped areas, paved areas, and wall perimeters.

4.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not

less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- D. Final Acceptance: When the City of St. George accepts the project as fully complete and takes ownership.
- E. Finish Grade: Elevation of finished surface of planting soil.
- F. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- G. Park Strip: Planting area between back of curb and concrete walk.
- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- I. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- J. Planting Area: Areas to be planted.
- K. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

- N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- O. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- P. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- Q. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- R. Topsoil: The soil ordinarily moved in tillage or its equivalent in uncultivated soil. The "A" horizon which is the mineral horizon at the surface. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus.
- S. Weed: Any plant other than that specified for the project in the area where a specific plant is designated.

4.4 SUBMITTALS

- A. Product Data: Submit to City's Park Planning Representative for approval for each type of product indicated, including soils.
 - 1. Plant Materials List: Grower's project supply list, include quantities, sizes, quality, and sources for plant materials.
 - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
- B. Samples for Verification: For each of the following:
 - 1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 - 2. Mineral Mulch: 1 lb of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on the site; provide an accurate indication of color, texture, and makeup of the material.
 - 3. Tree Grates and Accessories: Manufacturer's cut sheets listing standard size, to verify design and color selected.

- C. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Material Test Reports: For existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of maintenance by owner.
- F. Warranty: Sample of special warranty.

4.5 QUALITY ASSURANCE

- A. Installer Qualifications: Shall be a City Certified Licensed Landscape Contractor. The Landscape Contractor shall provide a superintendent for this project who has been certified by a City of St. George approved certification program to install landscape materials, meet state and local license, insurance and bonding requirements Per Section 10-25-3 (B1) of the City of St. George Landscape Ordinance, and is able to show proof of such upon demand.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor fluent in English on Project site when work is in progress.
 - 2. Pesticide Applicator: State licensed, commercial.
 - 3. Tree Pruner Qualifications: City of St. George Tree Pruner's License per Title 7, Chapter 4-4.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory with the experience and capability to conduct the testing and analysis indicated and that specializes in types of tests to be performed.
 - 1. AgSource Harris Laboratories
300 Speedway Circle
Lincoln, NE 68502
(402) 476-0300
 - 2. Wallace Laboratories
365 Coral Circle

El Segundo, CA 90245
(310) 615-0116

3. Soil & Plant Laboratory
1594 N. Main Street
Orange, CA 92867
(714) 282-8777

- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; mineral and plant-nutrient content of the soil (N, P, K, Mg, Ca, S, Z, Mn, Cu, Fe, B) cation exchange capacity (CEC); sodium absorption ratio, soluble salts, deleterious material (including but not limited to problem salts, minerals, heavy metals, etc); pH; and amendment recommendations.
 1. Soil samples shall be taken per the instructions of the soil-testing laboratory; with depth, location, and number of samples to be taken. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 2. Report suitability of tested soil for plant growth.
 - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1. In addition to ANSI Z60.1 shape and form of trees shall **not** have any of the following characteristics co-dominant stems, have the central leader cut, decurrent growth habit, or bark inclusion. Trees shall have good branch attachment and be structurally sound.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of

tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 12 inches above the root flare.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

- F. Plant Material Observation: Park Planning Representative shall observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Park Planning Representative retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Park Planning Representative of sources of planting materials five to seven days in advance of delivery to site.

- G. Pre-Installation Conference: Conduct conference at Project Site.

4.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

- B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

- C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 45 to 80 deg F until planting.
- G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

4.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify Project Manager no fewer than five days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without Project Manager's written permission.
- C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Tree Planting: September 1st to May 31st.
 - 2. Shrubs Planting:
 - a. Spring Planting: February 15th to June 15th
 - b. Fall Planting: September 15th to November 1st

- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

4.8 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control. Weather and winter temperatures are **NOT** considered "incidents beyond the contractor's control" and plants must be replaced under this warranty section.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization (staking or guying).
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Periods from Date of Final Acceptance:
 - a. Trees, Shrubs, and Perennials: 12 months.
 - b. Annual Vines, Non-hardy Ornamental Grasses, Annual Ground Covers, Biennials, Herbaceous Annuals and Other Plants: 3 months or until first frost.
 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.

- d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

4.9 INSPECTIONS

- A. The City of St. George Park Planning Division will make landscape inspections listed below. Contractor must obtain approval from Park Planning Division Inspector before proceeding with the next item or risk removal and replacement of work installed without additional compensation.
 1. Pre-construction meeting
 2. Approve topsoil and agronomics soil test and recommendations
 3. Verify soil preparation/amendments
 4. Verify plant species, size, quality, quantities and location.
 5. Planting depth, staking
 6. Finish grade
 7. Substantial completion inspection
 8. Review of punchlist items
 9. Final Acceptance

4.10 MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees and Shrubs, Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until Final Acceptance of the project by the City.
 1. Contractor to schedule a Plant Maintenance site observation visit with the City Park Planning Representative to begin the Plant Maintenance Period and Complete Final Acceptance of the project.
 2. Contractor to schedule a final Acceptance verification site visit to end Contractor's required maintenance and complete Final Acceptance of project by the City.

PART 5 - PRODUCTS

5.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of

disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with clipped, damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings. Tags are to remain on the plant material until Final Acceptance and be removed immediately afterwards.
- E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Shrubs: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.
- 5.2 INORGANIC SOIL AMENDMENTS
- A. Based on soil analyses one or more of the following organic soil amendments may be required.
1. Sulfur
 2. Iron Sulfate
 3. Aluminum sulfate
 4. Perlite

5. Agricultural Gypsum
6. Sand
7. Utelite E-Soil® Products.
8. Granule Humate (Leonardite – high quality) – no greater than 37% ash content
 - a. Apply at the rate of 200 lb/acre
9. Humic Acid/Fulvic Acid Extraction – no less than 8% humic acid, no less than 20% fulvic acid
 - a. Must contain at least 200 ppm Fulvic Acid
 - b. When tested for Total Acidity, COOH, and OH groups, the total acidity must average at least 4.0 meq/g.
 - c. Total COOH groups tested must average at or above 1.8 meq/g.
 - d. The OH groups tested must have an average of at least 1.5 meq/g.
 - e. Humic acid testing must demonstrate content of at least 16 g/L of humic acid. Of that humic content (after the fulvic was separated out), the total acidity shall be at least 2.0 meq/g, the total COOH groups shall be 1.5 meq/g or greater and the total OH groups must be 0.1 meq/g – absent the fulvic component.
 - f. Apply at the rate of 8 gal/acre
10. Calcium
11. Sulfur
12. Manganese
13. Zinc

5.3 ORGANIC SOIL AMENDMENTS

- A. Based on soil analyses one or more of the following organic soil amendments may be required.
- B. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through [3/4-inch (19-mm)] sieve; soluble salt content of [5 to 10] decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 1. Organic Matter Content: 20 percent of dry weight.
- C. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.
- D. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

- E. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
- F. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
- G. Nutrimulch All Purpose Compost

5.4 FERTILIZERS

- A. Based on soil analysis one or more of the following fertilizer components may be required
 1. Bonemeal
 2. Superphosphate
 3. Commercial Fertilizer
 4. Slow-Release Fertilizer
 5. Chelated Iron
 6. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

5.5 PLANTING SOILS

- A. Planting Soil: Existing, in-place surface soil or native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil through required soil analysis. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 1. Supplement with planting soil when quantities are insufficient.
 2. Mix existing, native surface topsoil with the soil amendments and fertilizers per the soil analysis results to produce planting soil:
 - a. Ratio of Organic Compost to Topsoil by Volume: 20%.
 - b. pH: 6.5 – 7.8
 - c. Soluble Salts: <4 ds/m or mmho/cm
 - d. Sodium Absorption Ratio (SAR): 3-7
 - e. Sand: 20-70
 - f. Silt: 20-70
 - g. Clay: 10-20
- B. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension (maximum 5% rock in total volume); free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of weeds and invasive, not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
 2. Mix imported topsoil or manufactured topsoil with the following soil amendments per the soil analysis results to produce planting soil:
 - a. Ratio of Organic Compost to Topsoil by Volume: 20%.
 - b. pH: 6.5 – 7.8
 - c. Soluble Salts: <4 ds/m or mmho/cm
 - d. Sodium Absorption Ratio (SAR): 3-7
 - e. Sand: 20-70
 - f. Silt: 20-70
 - g. Clay: 10-20
- C. Lightweight On-Structure Planting Soil: Mix produced by modifying planting soil as follows:
1. Utelite E-Soil® Products per manufacturer's recommendations.

5.6 MULCHES AND BOULDERS

- A. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:
 1. Type: Angular crushed stone
 - a. Size Range: 1/2 inches minimum – 5/8" inches maximum
 - b. Color: Cappuccino Brown
- B. Boulder: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of the following type, size range and color.
 1. Type: Limestone
 - a. Size Range: 3 foot to 5 foot diameter
 - b. Color: Desert Varnish

5.7 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

5.8 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
 - 1. Upright and Guy Stakes: Rough-sawn, sound, new lodgepole pine, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated, pointed at one end.
 - 2. Proprietary Staking-and-Guying Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.
 - a. Products: Subject to compliance with requirements, provide the following:
 - 1) Wonder Tree Tie – two per tree

PART 6 - EXECUTION

6.1 EXAMINATION

- A. No planting operations shall commence until the irrigation system has been installed, inspected and trenches are backfilled.
- B. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
 - D. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by City Park Planning Representative and replace with new planting soil.

6.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Spray out all weeds with post-emergent herbicide and wait 7 days for kill prior to grubbing and removal.
- C. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Lay out individual tree and shrub locations and areas for multiple plantings. Stake or flag locations, outline areas, adjust locations when requested, and obtain City Park Planning Representative's acceptance of layout before excavating or planting. Make minor adjustments as required.
- E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

6.3 PLANTING AREA ESTABLISHMENT

- A. Insure planter subdrainage is installed, inspected and approved.
- B. Loosen subgrade of planting areas to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

- C. Thoroughly blend planting soil on-site before spreading.
 - 1. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
- D. Spread amended planting soil to a depth specified on plans but not less than required to meet finish grades after natural settlement and mound 6 inches at the center of the planting area. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- E. Finish Grading: Grade planting areas to a smooth linear mound, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Insure positive surface drainage.
- F. Before planting, obtain City's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

6.4 EXCAVATION FOR TREES AND SHRUBS

- A. Tree Planting Pits: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that tree root ball will sit on compacted base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately two times as wide as root ball diameter for container-grown stock.
 - 2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 5. Maintain supervision of excavations during working hours.
 - 6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
 - 7. If drain tile is shown on Drawings or required under planting areas, excavate to drain to top of porous backfill over tile.
- B. Subsoil removed from excavations may not be used as planting soil.
- C. Obstructions: Notify City Park Planning Representative if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Drainage: Notify City Park Planning Representative if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

6.5 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inches (50 mm) above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

6.6 TREE, SHRUB, AND VINE PRUNING

- A. Tree pruner must meet required qualifications.
- B. Remove only dead, dying, or broken branches. Do not prune for shape.
- C. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.
- D. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- E. Do not apply pruning paint to wounds.

6.7 TREE STABILIZATION

- A. Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake all trees. Use a minimum of two stakes of length required to penetrate at least 24 inches below bottom of backfilled excavation and to extend to the dimension shown on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
 - 3. Proprietary Tying Device: Install tying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

6.8 PLANTING IN PLANTERS

- A. Comply with Section 334600 Subdrainage or as otherwise indicated per construction plans and details.
- B. Fill planter with planting soil per construction plans and details. Place soil in lightly compacted layers to an elevation of 3 inches below top of planter edges, allowing natural settlement and application of mulch. Mound soil as shown in details.

6.9 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Organic Mulch in Planting Areas: Apply 2-inch thickness of organic mulch over entire surface of planting area per construction plan layout and details and finish level with adjacent finish grades. Do not place mulch within 12 inches of tree trunks of shrub stems.
 - 2. Mineral Mulch in Planting Areas: Apply 2-inch thickness of mineral mulch over whole surface of planting area per construction plan layout and details and finish level with adjacent finish grades. Do not place mulch within 12 inches of tree trunks or shrub stems.

6.10 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

6.11 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

6.12 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and immediately after Final Acceptance, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

6.13 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

6.14 INSPECTION AND ACCEPTANCE

- A. When the landscape work is completed, the City of St. George Park Planning Division representative will, upon request, make an inspection to determine Substantial Completion.
- B. The warrantee begins from the date of Final Acceptance.
- C. Where inspected landscape work does not comply with the requirement, replace rejected work and continue specified maintenance until re-inspected by the City of St. George Park Planning Division representative and found to be acceptable. Remove rejected plants and materials promptly from the project site.
- D. As-built Drawings and Compliance Letter: Landscape Contractor is to furnish to the Owner's Authorized Representative at the time of Substantial Completion the As-Built Drawings and a letter certifying that all improvements have been installed in accordance with the approved plans and specifications.

END OF SECTION 329300

SECTION 334600 - SUBDRAINAGE

PART 7 - GENERAL

7.1 RELATED DOCUMENTS

- A. City of St. George Standard Specifications for Design and Construction, latest edition.

7.2 SUMMARY

- A. The work covered by this section consists of furnishing all labor, materials, equipment and supplies in performing all operations in connection with landscape drainage work in strict accordance with this section and applicable drawings. Work includes placement of landscape drainage pipe, filter fabric, bedding material, connections, etc.
- B. Any minor items of labor or materials not specifically noted on the drawings or specifications; but necessary for the proper completion of the work, shall be considered incidental to and are to be included in the work.
- C. Work under this section shall include coordination of all work with all other sections of these specifications.
- D. Section Includes:
 - 1. Perforated-wall pipe and fittings.
 - 2. Geotextile filter fabrics.

7.3 SUBMITTALS

- A. Product Data:
 - 1. Drainage conduits, including rated capacities.
 - 2. Geotextile filter fabrics.
 - 3. Drainage course gradation test results.
- B. Record Drawings:

PART 8 - PRODUCTS

8.1 PERFORATED-WALL PIPES AND FITTINGS

- A. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

8.2 SOLID WALL PIPES AND FITTINGS

- A. Solid PCV sewer pipe and fittings: per City of St. George Standard Specifications For Design and Construction.

8.3 GEOTEXTILE FILTER FABRICS

- A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.
- B. Structure Type: Nonwoven, needle-punched continuous filament.
 - 1. Styles: Flat and sock.

8.4 CLEAN OUTS

- A. Per City of St. George Standard Drawing No. 230 or 231.

8.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

PART 9 - EXECUTION

9.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.
- B. Locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Ensure lid will not conflict with proposed structures such as curbs and gutters.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

9.2 EARTHWORK

- 1. Subject to compliance with City of St. George Standard Specifications for Design and Construction, latest edition.

B. DEFINITIONS

1. Backfill: Soil material used to fill an excavation.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.
3. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; placed directly adjacent to drainage pipes and conduits.

C. SUBMITTALS

1. Product Data: For each type of the following manufactured products required:
 - a. Warning tapes.
2. Samples for Verification: For the following products, in sizes indicated below:
 - a. Warning Tape: 12 inches long; of each color.
3. Drainage Course: gradation test results

D. SOIL MATERIALS

1. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

E. ACCESSORIES

1. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 2 inches wide, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - a. Green: Sewer/Drainage systems.

F. PREPARATION

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
2. Protect and maintain erosion and sedimentation controls during earth moving operations.

G. SUBSURFACE DRAINAGE

1. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface

drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

- a. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.
2. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 24 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 - a. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.

H. SUBGRADE INSPECTION

1. Notify Inspector when excavations have reached required subgrade.
2. If Inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

I. UTILITY TRENCH BACKFILL

1. Place and compact backfill in excavations promptly, but not before completing the following:
 - a. Surveying locations of underground utilities for Record Documents.
 - b. Testing and inspecting underground utilities.
 - c. Removing trash and debris.
2. Place backfill on subgrades free of mud, frost, snow, or ice.
3. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the geotextile.
4. Install detectable warning tape directly above drainage pipe, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

9.3 LANDSCAPING DRAINAGE INSTALLATION

- A. Provide trench width to allow installation of drainage conduit. Grade bottom of trench excavations to maintain positive flow, and compact to firm, solid bed for drainage system.
- B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 6 inches.

- D. Install drainage conduits as indicated in Part 3 "Piping Installation" Article for landscaping subdrainage with horizontal distance of at least 6 inches between conduit and trench walls. Wrap drainage conduits without integral geotextile filter fabric with flat-style geotextile filter fabric before installation. Connect fabric sections with tape.
- E. Add drainage course to top of drainage conduits.
- F. After satisfactory testing, cover drainage conduit to within 12 inches of finish grade.
- G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.
- H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.
- I. Fill to Grade: Place satisfactory soil fill material over drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

9.4 PIPING INSTALLATION

- A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
 - 1. Landscaping Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 24 inches unless otherwise indicated.
 - 2. Lay perforated pipe with perforations up.
 - 3. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
- B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

9.5 PIPE JOINT CONSTRUCTION

- A. Join perforated PE pipe and fittings with couplings according to ASTM D 3212 with loose banded, coupled, or push-on joints.
- B. Join perforated PVC sewer pipe and fittings according to ASTM D 3212 with loose bell-and-spigot, push-on joints.

- C. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

9.6 CONNECTIONS

- A. Comply with requirements for piping specified in City of St. George Standard Specifications for Design and Construction, latest edition.
- B. Connect low elevations of subdrainage system to solid-wall-piping storm drainage system.

9.7 IDENTIFICATION

- A. Arrange for installation of green warning tapes directly over piping. Comply with requirements for underground warning tapes specified in specified in Division 31 Section "Earth Moving."
 - 1. Install PE warning tape or detectable warning tape over ferrous piping.
 - 2. Install detectable warning tape over nonferrous piping and over edges of underground structures.

9.8 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Subgrade of trench with pipe bedding installed (if required) to ensure smooth, positive flow grade for Subdrainage pipe.
 - 2. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling in the presence of City Representative.
 - 3. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
- B. Drain piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

9.9 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 334600

Geotechnical Report